

FLIGHT LINE

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The Luftwaffe lost air superiority in 1943 because they kept flying into observation decks

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The Editor's Turn

As promised, your editor was at conferences in Germany and England for much of July, so this issue of FLIGHT LINE is late. But with luck, it will reach you before the Fellow Feathers Glider Auction, which will be held at the Club House at Fort Funston, Sunday August 27. Read all about it in this issue of the FLIGHT LINE.

Germany and England were great. I saw a few interesting aircraft, several of which may be featured in this of future issues.

It sounds like people were busy over the past month. Two new world Open Distance Records? Not bad. It's nice to see that those klunky old rigid wings are good for something! There have also been quite a few broken gliders. I saw two of them myself.

On July 16, a pilot had his right leading edge break on launch at Dunlap. It snapped! Just outboard of the crossbar-leading edge junction!

It's difficult to imagine how this could happen. The spar must have already been damaged before launch. Somehow the wing did not fold up. The glider continued to fly with the wing supported by tension in the leading edge cloth! In fact, the pilot reported that he did not at first realize anything was wrong. Eventually he noticed that the roll response was a bit odd, looked at his wing, and decided that it might be a Really Good Idea to go down and land. The wing folded up a shortly after he touched down.

It's difficult to make any meaningful recommendations based on this incident. Annual inspections are a good idea? Conduct a careful pre-flight inspection to make sure your leading edge doesn't have a big old crack in it? Find out what religion this pilot belongs to and switch to a different one because he has obvi-

ously used up their god's supply of miracles?

On August 12, there was a parachute deployment at Hill. It is not clear how the glider got broken - I was in the air at the time only a few hundred yards away and it was not a particularly rowdy day - but there is some rumor that some form of 'maneuvers' may have been involved. The pilot got his chute out immediately, did an excellent job of staying in control of the situation, and touched down on a shallow slope a few dozen yards from Lower Launch. The pilot escaped with mild facial lacerations.

Once again it's difficult to make any recommendations. Don't do aerobatics on strong thermally days? If your glider breaks at 8000' MSL, remember to deploy your parachute? Keep your head in a bad situation?

That's probably the best moral for both these stories. Both pilot's kept their heads in a bad situation, and both pilots pulled it off. Congratulations, guys! And thanks!

Fellow Feathers Glider Auction

The Fellow Feathers will hold a Hang Glider Auction on Sunday August 27 at 10 am.

21 hang gliders will be auctioned

The auction will be held at the Fellow Feathers Club House in Fort Funston National Park, on Highway 1 in San Francisco, just south of Lake Merced.

The Club House is located near the entrance at the rear of the parking lot.

July Meeting Minutes

by Paul Clayton

NEW MEMBERS / GUESTS

Clifton Moody - HG student

GREAT FLIGHTS

Bob Trumbly - flew from Diablo to Tracy to Bethel Island, a 51mile flight. John Youngblood - flew a 70mile out and return from Chelan Butte. Steve Rodrigues - celebrated his 20th anniversary in hang gliding. Mike Vorhis and Paul Clayton made goal each of the three days of the Wild Wild West Regionals in Carson City.

PRESIDENT'S REPORT - Mark Mullholland

Plans are underway for the "Worlds Largest Flyin". A date for the event has not been set at this time, however, it is intended to include a speed gliding contest, a spot landing contest and soaring, depending on the weather. Mark has a goal of 350 pilots turning out for the event. Another competition, with a cross country format, is still planned. Scoring software compatible with GPS is needed.

VICE PRESIDENT'S REPORT - None

John Wilde was not present.

TREASURER'S REPORT - None

Don Jones was not present.

FLIGHT DIRECTOR'S REPORT - Bob Trumbly, et al

Kevin Dutt tumbled on his Ghostbuster at Slide Mt. He successfully deployed his parachute and was not seriously hurt. There was a leading edge failure of an older flex wing at Dunlap. The pilot landed unhurt.

ED LEVIN SITE COMMITTEE REPORT - Steve Pittman

There was an accident recently, and the pilot, who apparently was not seriously hurt, did not call 911. The mowing of the LZ is now complete. Plans to rebuild the walkover are still pending. There were no suspensions this month.

MISSION PEAK SITE COMMITTEE REPORT - Steve Rodrigues

Motor vehicles should be kept off tall grass, due to the fire hazard at this time of year.

M T. DIABLO SITE COMMITTEE REPORT - Bob Trumbly

The insurance paperwork is done for the year. A system is needed to remind the responsible people when this needs to be done, as it was overlooked this year.

NEWSLETTER REPORT - No report

COMPETITION COMMITTEE REPORT - Mark Mullholland

There is a fly-in/competition at Hull Mt on August 12 and 13, and a Sonoma Wings Contest August 19th and 20th. There have been some good flights entered in the X-C contest. A speed gliding meet is planned for this September.

OLD BUSINESS - None

NEW BUSINESS

Pat Denevan reported that there will be a launch and landing clinic on 8-20, and a Labor Day fly-in at Dunlap. Mission Soaring now has a winch, which is used for towing operations in Hollister.

END OF MEETING MINUTES



Oludeniz -- The Jewel of the Turquoise Coast by Kim Galvin

I have read the articles about paragliding adventures that involve hiking or driving long distances, waiting hours or days for suitable weather conditions, sleeping wrapped up in one's wing and eating freeze-dried food. This is not what I look for in a vacation. What I want is a real vacation. I want to be in a place that is fun and relaxing, regardless of the flying prospects. And I want to be in a place that provides the opportunity to fly as often as possible. Oludeniz is all that and more.

Oludeniz ("Calm Sea") is a Mediterranean seaside village on the southwestern coast of Turkey. The town of Oludeniz consists of a picturesque valley with small hotels nestled together and a sandy beach lined with shops, restaurants and bars. The backdrop for this sun-worshiper's paradise is Babada? ("Father Mountain"), a 6,300' granite mountain covered with pine trees. Looking down at the sea from the summit, you can appreciate why they call this the "Turquoise Coast."

My husband and I have made three trips to Oludeniz. On our first visit, we were tourists, not pilots. We enjoyed the fine beaches, excellent restaurants, quaint villages, historical and archaeological sites and unique natural wonders. From our beach

side chaises, we watched hundreds of paragliders descending from Babada? and landing on the beach. Even though we had no idea what we were getting ourselves into, we signed up for tandem flights and the rest is history. On our second and third trips to Oludeniz, we went as solo pilots.

With all the wonderful places in the world to fly, why do we continue to return to Oludeniz? Every time we've been there (during the first two weeks of September), it has been flyable almost all day, every day. You don't have to worry about the weather, because it's always warm and sunny. You don't have to worry about the wind direction, because there are launches in all directions. The tandem companies send trucks up the mountain from sunrise to sunset, so you can fly whenever you feel like it without worrying about transportation or retrieves. There's no planning, no schedules and no worries. If you can manage to get yourself out of bed in the morning, everything else just falls into place.

It is not necessary to have a car in Oludeniz, as all of the restaurants and bars, as well as the transports to the top of Babada?, are within an easy walk of the hotels and the LZ. You can fly until you get hungry, have a bite to eat, take a nap or swim and fly again. If you are traveling with non-pilots there's no end to the activities available from the beach (diving, snorkeling, parasailing, white water rafting and boat, jeep and/or bus tours). The restaurants, bars and hotels are extremely accommodating and very reasonably priced. If you've never experienced Turkish food, you're in for a treat.

So, how's the flying? That depends on what you want. The launches are at 6,300' and 5,600'. Most of the launches are wide and well graded, although a bit

rocky, with mild slopes. The wind is usually light, and thermals normally come up from all sides, so most of the time you can choose your launch. If you are a beginner, or purely a recreational pilot, you can launch almost anytime of the day, fly away from the mountain and descend in buoyant air that's as smooth as glass, with awesome scenery. Thermals start forming at around 10:00 and build until around 4:00. Occasionally you'll see dust devils converging at launch, so strong launching and ground handling skills are a big plus. More experienced pilots, who want to soar or go cross-country, may do so in mild to moderately strong conditions, by working the launch areas and upper ridges and gorges. It isn't difficult to get a few thousand feet over launch, even early in the day. Sometimes, usually mid-day, clouds form around the mountaintop, so it's prudent to carry a compass.

If you're interested in practicing SIV maneuvers, then this is the place. You can fly away from the mountain and over the water, with 3-4,000' to spare and practice stalls, spiral dives, wingovers or aerobatics, over the calm sea, knowing that a nearby fishing boat will rescue you if all else fails. A sled ride lasts about twenty-five minutes, but we have had soaring flights of several hours. The LZ is a mile-long, wide, sandy beach. If you land by one of the paragliding shops, a packer will fold your wing and repack your gear for just a little over \$1. Best of all, you're only a few steps away from a cold drink or good meal.

There are several other flying sites in Turkey where hang- and paraglider pilots are welcomed. For the past two years we have considered travelling to one of the other nearby sites, but we couldn't break away from the enjoyment and convenience of Babada?. There are Internet sites

that describe these other flying locations and there are local guides in Oludeniz who can help you find them (see below).

The season for paragliding, and other activities in Oludeniz, is May through October. The locals say that May and September offer the best weather and have fewer tourists. In June, July and August it is more crowded and it can get quite hot. In 1999, tourism in Turkey was considerably lighter than usual. There were far fewer tourists and visiting solo pilots in Oludeniz, compared to our previous trips. Some western countries are warning vacationers not to visit Turkey because of earthquakes and the PKK. I can tell you, first hand, that politics and natural disasters have had no noticeable effect on this idyllic town. I felt safer in Turkey than I have on any of my travels, as well as here at home. A couple of the paragliding shops went of business during the past year and we worry that some of the other smaller businesses may not be able to survive. On the other hand, prices are low and the locals are even more attentive and appreciative of visitors than ever.

We had often wondered what would happen if we required medical care in rural Turkey. Unfortunately, we found out when my husband broke his leg and bruised some ribs on launch a few days into our trip. An ambulance, with paramedics, is stationed at the mountaintop everyday. The hospital in nearby Fethiye is modern and it has a special Department of Tourism Health, who made sure that we saw English-speaking doctors. They were prompt, but thorough. A few hours after Mike was admitted, the ambulance transported us back to our hotel. When we returned to the San Francisco Bay Area, a local orthopedist confirmed that the Turkish doctors did an excellent

job setting his leg.

Turkey offers a diverse and unique blend of eastern and western cultures. It is western enough to appeal to less adventurous folks on holidays, but eastern enough to feel exotic, even to more experienced travelers. The secular government of Turkey is working very hard to be accepted by the western world and the Turkish people are very tolerant and hospitable. We have had several paragliding vacations where the local pilots, and their communities, have made us feel welcome. But we have never experienced the overwhelming warmth, humor and generosity of the pilots and others who we met in Oludeniz. At the end of our two-week vacation, we knew almost all of the pilots, as well as most of the people who work in the shops and restaurants along the beach. When we return to Oludeniz next year, we will be returning, not just as tourists or pilots, but as friends and "family!"

More Information About Oludeniz

The flight from Istanbul to Dalaman takes approximately an hour and it takes about an hour to drive from the airport in Dalaman to Oludeniz.

Tandem Paragliding and Transportation for Solo Pilots

There are several qualified companies along the beach that provide tandem paragliding and transportation for solo pilots. My personal favorite is Sky Sports (www.paragliding.net/skysports/index.html). They are the most experienced and professional and they took good care of us. In addition to providing transportation to launch, they can give you site intros and information about weather conditions. The drivers will make sure that you're off the mountain before the truck leaves

the launch area. The tandem pilots, office staff, drivers and packers are all terrific. Contact Murat Tuzer (skysports@paragliding.net) for more information. He can also help you book a room or arrange transportation to and from the airport in Dalaman.

The ride to the top of Babada? takes about an hour, along a steep, but well maintained, dirt road. You pay the driver about \$6.50 for each ride. The park entry fee is an additional \$6.50 per trip. There are wind indicators (and toilets) at each launch.

Equipment Repairs and Reserve Repacks

Semih Sayir, owner of The Edge Paragliding (theedgepg@hotmail.com), has a shop which is located a block off the beach. Semih can help you with equipment repairs and reserve repacks. He can also provide you with individual SIV training and information regarding cross-country flying in the area.

SIV and Cross-Country Courses

For the past two years I have watched Jockey Sanderson (escape.adv@dial.pipex.com) conduct SIV and XC courses at Babada?. He is famous throughout the United Kingdom for these courses, which he offers every year in May and September. For a preview, check out his Security in Flight video, which is available where most paragliding products are sold. I have spoken to several of his students and, based on their experiences and my own observations, I plan to attend one of his courses next year.

Hangliding at Babada?

Each time we visited Oludeniz we saw only one hanglider, but I think this site would be great for

hangliding. The tandem trucks can transport hanggliders to launch. The northern launch, which is the steepest, should work well for take-offs. The far end of the beach, which is wider and has fewer sunbathers, should make landings pretty easy. If you can figure out how to get your hanglider to Turkey, you should have no problem flying at Babada?

Accommodations

Stationary tents and back-packer cabins are available for \$6-15. Rooms in the smaller hotels start at \$25-35. The top of the line hotel, located on the beach, is the Club Belcekiz Beach (www.belcekiz.com). Their double rooms are around \$50-\$70, which includes a full breakfast.

Restaurants

The Buzz Grill, located on the beach, is a moderately priced restaurant that offers a variety of starters (many of which are vegetarian), grilled fish, kebabs and other Turkish specialties. The Waterside is located down a side street, halfway down the beach. It is a little quieter than the beachside restaurants, with candle-lit tables and good food. Kum Tur is a traditional Turkish restaurant, further down the beach, with a diverse menu, great prices and the best pide (Turkish pizza) on the beach. The Grapevine, located a block away from the beach, has a quiet garden-like setting.

For lunch, try Hippie Shake for sandwiches, salads and smoothies or any of the restaurants that serve Doner Kebabs (yummy sandwiches with chicken and/or lamb) to go. They are perfect for a satisfying and inexpensive snack between flights.

If you have a special occasion to celebrate, try The White Dolphin, a more upscale, seafood restau-

rant on a hill overlooking the sea.

Bars

Go to the rooftop Buzz Bar for happy hour. Listen to good music and watch the last flights of the day landing on the beach while the sun sets over the lagoon. Cloud 9 is also a popular spot for drinks, snacks and desserts.

Speeds to Fly for the Weekend Pilot

by Paul Clayton

We have all heard the mantra "speed up in sink, slow down in lift." In response to which many of us have asked "yeah, but how much, and how big a difference does it make, anyway?" There have been several instruments devised to help answer the first question, notably the MacCready speed ring, and more recently, flight computers such as Chris Arai's Tangent. Numerous claims have been made about the second question, i.e. how much do we gain by flying at the optimum "speed to fly" compared to just flying at best glide. Some people have claimed gains of up to 25%.

To answer these, and other burning questions, I recently visited the Wills Wing website (www.willswing.com), and downloaded their polar data for several gliders. By the way, I don't think that Wills Wing rules the sky, although I currently fly one. I just used their data because they are readily available. The website also includes Mike Meier's discussion of how the data were collected, and a carefully worded disclaimer as to their accuracy.

Polar data simply show the glider's sink rate at various airspeeds. These data can be analyzed to determine the best speed to fly

for any combinations of sink, lift, headwind, and tailwind. For any set of conditions, there is an air-speed that results in the best net glide, i.e. best glide over the ground. A good discussion (with snappy moving graphics) of speed to fly theory can be found at <http://home.att.net/~jlburch/polar.htm>, or in Dennis Pagen's book Performance Flying.

Competition pilots want to complete the assigned task quickly, whereas most weekend pilots are just trying to get to the next thermal without hitting the ground first. These two goals require different speeds to fly. The weekend pilot usually wants to maximize glide over the ground, since terrain features often trigger thermals (and sink). The idea is to get to the next area where there is likely to be lift, while staying as high as possible. An exception to this rule is when flying in cloud street conditions, or over flat ground, where the strategy is to maximize glide through the air, that is, without regard to the wind direction. Competition pilots will fly faster than the best net glide speed, because they want to get to the next thermal sooner. The theory is that the extra time needed to climb back to altitude in the next thermal will be more than offset by the time saved by flying faster during the glide. This is a risky strategy, because it assumes that strong lift is in the pilot's immediate future. We all know that is not always the case. Most weekend pilots just try to cover ground with as little altitude loss as possible. For the purposes of this discussion, "speed to fly" means that speed which gives the best glide ratio relative to the ground.

With these principles in mind, I took the polar data for the Falcon and the Fusion, and did a curve fit for ease of analysis. I chose these gliders because they represent the two ends of the spectrum in the performance vs. hassle tradeoff

among current production gliders. For those not familiar with the gliders, the Falcon is a single surface glider, which is often used as a trainer. Experienced pilots who want a lightweight, low hassle glider also fly it. The Fusion is a topless blade wing, whose performance is comparable to other competition class wings. According to the Wills data (see reference to disclaimer above), the Falcon gets about a 9.6:1 glide at 25mph, and a 213 foot/minute (fpm) sink rate. The Fusion gets about a 14.1:1 glide at 29mph, and a 175 fpm sink rate. For the purposes of this discussion, we will assume that the climb rates of the two gliders are equal. This is consistent with my observations of the real world performance of the gliders. While a topless glider has an advantage in pure sink rate, the single surface glider is more maneuverable, and can fly slower. Also, the topless glider gets some of its performance edge during a glide by flying with the VG set tight, but most pilots keep the VG loose for thermalling.

Let's assume that two seasoned soaring pilots, one on each glider, climb together to the top of a thermal. They decide not to go X-C, and fly back to the front side of the mountain. If they encounter 600 fpm sink and a 15mph headwind, the topless's speed to fly is 45.2 mph, vs. 37.4 mph for the single surface. The topless has an advantage of 43% in net glide, compared to about 48% in still air. The topless's glide is reduced to 2.34:1, while the single surface cops an amazing 1.6:1 glide. The topless's pilot flies 58% faster than best glide, vs. 53% for the single surface, and their net glide ratios are improved by 52% and 61% respectively, compared to what they would have netted by flying best glide. This is clearly a situation in which understanding speed to fly is important for safety. The pilot of the topless reads

1130 fpm sink on the vario, while the single surface pilot sees 1210 fpm.

Next, let's imagine that they decide to fly out to the LZ and land. They encounter a 15 mph headwind, combined with 100 fpm lift. The topless's pilot flies at about best glide, while the single surface's pilot speeds up 26%, to 31 mph. This nets the topless a glide of 15.4:1, while the single surface glider has its glide reduced to 3.1:1, which gives the topless a 390% advantage in net glide. The single surface glider's performance is improved by 22% by flying speed to fly.

On a happier note, let's imagine that they make it back to the front side of the mountain, work another thermal, and go over the back. Then they encounter 400 fpm lee side sink, with a 15 mph tailwind. The topless's pilot speeds up by 12.2%, to 32.1 mph, and improves its glide by 2%. The single surface's pilot speeds up by 8.5%, to 27 mph, and improves its glide by 1.1%. Flying speed to fly increases their ground speeds by 8 and 8.5% respectively, while the topless's net glide advantage, compared to the single surface, is reduced to 20%.

Once they get a few miles downwind, the tailwind goes away, but they thermal up again and go on another glide, in 1000 fpm sink. The topless's pilot speeds up 52%, to 44 mph, and nets a glide of 2.6:1. This improves the glider's net glide ratio by 22%, and its ground speed by 52.4%. The single surface's pilot speeds up 42%, to 35 mph, and nets a glide of 2.1:1, an improvement of 17% over the performance at best glide. Its ground speed is increased by of 42%. The topless nets a 25% better glide than the single surface. Both pilots read about 1500 fpm sink on their var-

As they glide onward, the sink decreases to 400 fpm. The topless's pilot flies 24% above best glide, or 35 mph. This nets a glide of 4.7:1, which is 7.7% better than the glider would deliver at best glide speed. The topless's ground speed is 24% higher than it would be at best glide. The single surface glider is flown 20% over best glide speed, or 30 mph. This nets a glide of 3.7:1, which is an improvement of 6.1% over its performance if flown at best glide. Its ground speed is improved by 20% by flying speed to fly. The topless's pilot reads a sink rate of 670 fpm, while the pilot of the single surface reads 710 fpm. The topless nets a 28% better glide than the single surface.

A few miles further, the sink decreases to 200 fpm, which the topless's pilot reads as 411 fpm down, and the pilot on the single surface reads as 459 fpm. Both probably are still listening to their sink alarms. The topless nets a 6.9:1 glide, while flying 12% faster than best glide, or 32 mph. The topless's glide is improved by 3%, and its ground speed is improved 12%, compared to flying at best glide. The single surface glider flies 10% faster than best glide, or 27 mph. This nets a 5.2:1 glide, which is 2.3% better than that achieved by flying at best glide. The single surface's ground speed is improved by 10%. Under these conditions, the topless glider glides 32% better than the single surface.

Let's then imagine that our intrepid pilots encounter a crosswind. Ahead lies dinosaur country, devoid of roads, cold beer, and all the amenities of civilization. Upwind lies a familiar route, which they, and their driver, have done before. Downwind lies an area with roads and towns, but which is unfamiliar to them and their driver. The wind speed is a modest 10 mph. We will assume they both fly speed to fly on the

glides. If they go upwind, encounter no sink during their glides, and climb at 300 fpm in the thermals, the topless manages an average speed of only 8.5 mph, while the single surface is nearly stopped, at 4.4 mph. If they go downwind under the same conditions, the topless averages 27.6 mph, while the single surface is nearly keeping up, at 23.7 mph.

Still awake? What, then, can we conclude from this numerically dense tale?

First, differences in glider performance are amplified by headwind and lift, and minimized by tailwind and sink. Note that the topless outperformed the single surface by 390% (nearly 5 to 1) going upwind to the LZ in light lift, but only had a 20% edge going over the back in tailwind and sink. In still air there was a 48% difference. A glider moves forward and down through the air. A higher performance glider moves forward relatively fast or down relatively slowly, or some combination of the two. If the air's motion is adding to the forward and down velocities, (i.e. tailwind and sink) the air's motion can make differences in the glider's motion relative to the air relatively insignificant. Conversely, in lift and headwind, the net speed of the glider is the difference between its motion through the air and the motion of the air itself. Consequently, a small difference in the glider's motion relative to the air can make a big difference in its net glide. Flying in ridge lift, crabbing into the wind, has a similar effect. Performance differences perceived in these conditions are probably not as great as they seem.

Second, we see that even a high performance flex wing doesn't go upwind very well. The topless

Continued on page 8



The new Volksbuster 162 with attached Jumo 004 Autolaunch Pod

The New Heinkel Volksbuster 162

Heinkel Designs has just announced the release of their new Volksbuster 162 rigid wing. Built by slave labor from non-strategic materials, this wing is designed for both the competition pilot and the discriminating recreational pilot who wishes to defend the Fatherland. The Volksbuster 162 has a wingspan of 7.2m (23' 7.2"), an L:D of 18:1, and an impressive top speed of 902km/hr (562 mph) at 6000m (19,685'). At only 5,744 lbs, the Volksbuster 162 meets all FAI Class 2 requirements and can easily be foot-launched by Aryan supermen. The Volksbuster 162 comes equipped with a Junkers Jumo 004 Auto-launch Pod that delivers 1,764 lb of static thrust at sea level and twin 20mm MG 151 cannon to destroy Allied bombers or establish right of way in thermals.

Speeds to Fly

Continued from page 7

blade can go downwind more than 4 times as fast as it can go upwind, under the same thermal conditions, in a mere 10 mph wind. The difference is even greater for a single surface glider. Part of the difference is that the topless gets its best performance at a higher speed. Both gliders would go upwind better if they were loaded heavier, simply because their whole speed range would be shifted upward, making the wind speed a smaller percentage of their flying speed.

Third, it is only in extraordinary situations that there is any advantage in flying near the VNE of a glider. With 600 fpm sink and a 15 mph headwind, or 1000 fpm sink without a headwind, the pilot of the topless needed to fly at about the maximum rough air maneuvering speed (46mph). These are conditions we rarely encounter. When a pilot has the bar stuffed and says he's in 1000 fpm sink, the actual sink rate of the air is about 500 to 600 fpm. If

the bar is stuffed and the vario reads 500 fpm down, then the pilot should slow down, because the air is probably not sinking at all. Only competition pilots with altitude to burn should have any incentive to fly near VNE. Pilots of slower gliders will almost never gain anything by flying that fast.

Fourth, when flying in sink at "speed to fly" the improvement in glide ratio is subtle, and so is the change in airspeed. The pilot of a competition class wing, who encounters just enough sink to make the vario squawk, only needs to speed up 12%. Note also that the percentage increase in ground speed is always several times the percentage improvement in glide ratio when the pilot flies "speed to fly." That means that a competition pilot gets most of the gain from "speed to fly" by going faster, not by getting a flatter glide. The change in speed is not as subtle as the numbers make it look, however, because the perceived speed is based largely on the force of the wind hitting us in the face. The wind resistance we feel, and wind noise we hear, increases as the square of the airspeed. That means that a 12% increase in airspeed causes a 25% increase in wind drag and wind noise.

Finally, speed to fly is most important when trying to penetrate upwind. This is when speeding up makes a dramatic difference in the distance we are able to cover.

I hope this exercise in computer flying has contributed to a better understanding of this arcane subject. See you in the air.

WINGS FOR SALE



Wings for Sale

(Ad policy: ads run for 6 months, then are cancelled automatically unless they are renewed. Ads are free to WOR members)

Rigid Wings

Millennium, lots of upgrades, good condition, excellent performance and handling. The best rigid wing for the stick pilot. Photo at: <http://www.sirius.com/~mlbco/mill2.jpg>, \$7000 doo, Call Rick Cavalero at (650) 961-5735, rickcav@earthlink.net

Flexwings

Aeros Stealth 2 151 (late 1998), matrix cloth, climbs great, very fast, billboard glider, white IE, red and blue undersurface, must sell (ordered new Stealth). Comes with additional sail and 2 extra dtubes. \$2900 doo. Call Reto at (916) 804-4063, reto_s@yahoo.com

Fusion 150. Black/Blue, Less than 50 hours airtime. \$3,500. Call Steve at (415) 385-0423, swerthei@us.oracle.com

HP-AT 145. Approx 150 hours (or less). Good condition. Orange-light green-white. 6 hours airtime since last super pre-flight and flying wire change. Spare dtubes. \$800 doo. Call Weegie (510) 649-8181, weegie@lightroom.com

HP-AT 158. Orange/Red, Approximately 400 hours airtime. \$800. Call Steve at (415) 385-0423, swerthei@us.oracle.com.

HP AT 158. Great shape, new side wires, spare dtubes. Photo <http://www.sirius.com/~mlbco/class.htm> \$1000. Contact Rick at rickcav@earthlink.net, (650) 961-7825 ext 345.

HP-2. Blue/Turquoise, Good condition, Approximately 300 hours airtime. \$400. Call Steve at (415) 385-0423, swerthei@us.oracle.com

Moyes XS 169 Good condition. Blue and yellow under surface. \$550 Call Bruno (925) 837-4261, Brunoj@worldnet.att.net

Moyes XtraLite 164. Mylar sail. Good condition. Blue and yellow undersurface. \$1,150. Call Bruno, (925) 837-4261, Brunoj@worldnet.att.net

Mark IV 17. White with orange mylar leading edge. Selling because just bought new glider. \$900 doo, Call Sridhar Reddy at (650) 919-3778

Wills Wing Spectrum 144. Excellent condition Includes UV bag, ladder rack, straps, etc. Great beginner/intermediate glider. \$2250, Call Roger at (408) 882-0382 (w) (408) 224-1815 (h) rohang3@aol.com

Wills Wing Supersport 163. Major price reduction worth \$2,200 plus only want \$1700 original owner Excellent shape Lots of life left in it. Many extras Call Tom (408)747-0414.

Paragliders

FreeX Spear (L), violet/white. Approx. 150 hours. Still covered by FreeX 300 hours guarantee. One of the most responsive DHV 2 gliders around. \$900 doo. Call Steve Thorpe (408) 435 2600 ext. 506 (w), (408) 260 7029 (h), thorpes@arklogic.com

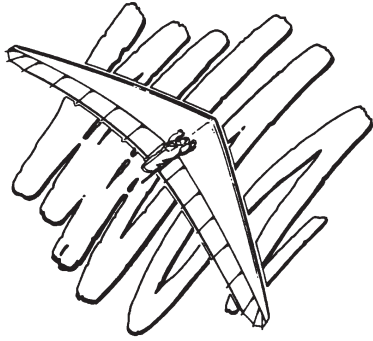
Equipment

Apco Top Secura Harness with kevlar backplate and CO2 air-bag protection. \$200 doo. Call Steve Thorpe (408) 435 2600 ext. 506 (w), (408) 260 7029 (h), thorpes@arklogic.com

CG 1000 harness for 5' 5" - 5' 8", \$200. 22-gore High Energy reserve, bridles for both hang and paragliding, \$200. Call (510) 787-6867 Cage2usa@aol.com

Tangent flight computer, \$500, Call Reto at (916) 804-4063, reto_s@yahoo.com

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*Wings of
Rogallo*

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The last Wings of Rogallo Meeting has already happened
Information for the next meeting will be announced in the
next issue of the FLIGHT LINE, or
for details check the Wings of Rogallo WWW Page
<http://www.wingsofrogallo.org/meetings.html>